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## **Virtual and non-virtual realities: the changing roles of libraries and librarians**

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Based on a presentation given at the UNESCO-ICSU Conference on Electronic Publishing in Science, Paris, February 2001.

*ABSTRACT: What is the future for libraries and their librarians? In trying to give an answer to this pressing question we do not deal with utopian libraries of the next century, but with the library and the librarian of the next decade. The emphasis is on libraries within educational and research institutions, especially university libraries.*

*We examine the changes confronting the library of the future and identify four key aspects of the library of the future. It will be (1) a gateway to information, whatever format this information comes in and wherever it is located; (2) an expertise centre; (3) a physical entity, not only in the sense of being a social meeting place and place of scholarly interaction, but also as a place where students and other users are provided with modern study facilities and adequate user support; (4) a collection centre of printed material.*

*Such libraries can only take on an appropriate shape and will only survive if the institutions that librarians serve in meet the four criteria outlined above. We look at the demands that will be made on professional library knowledge and skills and the new job responsibilities and job attitudes required.*

## **Introduction: the library and the provision of information**

Although many of us would like to believe that it was only in the 20th century that information started to become a factor of truly great importance, information has always played a crucial role in our society. Knowledge is our society's driving force, and information is what fuels that force: knowledge is power, and knowledge is based on information. If access to information was once the prerogative of a happy few, it is now perceived as a basic right; albeit sometimes a disputed one given the often heated debates on intellectual property rights.

Libraries play an important role in providing access to information. In fact, until the 1980s and 90s, libraries virtually had a monopoly on the provision of information to students, teachers and researchers. A library's value was primarily determined by the quality of its printed collections. However, the escalating quantity and cost of information has made it impossible for libraries to stock all the information that their users need. So, interlibrary loan, as well as other library services such as literature searches and user education and instruction have become increasingly important quality indicators.

Although the quality of the collection and the provision of library services are still crucially important factors, the past decades have seen a great deal of change in the field of scholarly information provision. Increased flow of printed material and the proliferation of electronic sources of information added to developments in information and communication technology have altered the face of our society and brought things that were once inconceivable within our reach. In addition, scientific education and research has undergone (and is still undergoing) considerable change. All these factors have affected libraries and there has been a good deal of discussion about how libraries should react in terms of altering their goals and objectives. Definitive answers depend on the point of view chosen. From a functional viewpoint, in principle, nothing need change as far as the library's overall direction is concerned. The scientific library's mission will remain the furthering of scientific education and research by means of optimal provision of services in the field. However, from an organizational point of view (the library as a university or faculty organization), it is evident that all these new developments will necessitate changes over the coming years.

## **The four pillars of the dual-purpose library**

As I see it, in order to fulfil its objectives, libraries will need to continue to carry out their current key tasks in the area of provision of scholarly information: building collections (including selecting and acquiring information), classifying and indexing, making material available to the public, providing user services, archiving, storing and conservation. However, the development of information and communication technology and the digitization of information result in considerable changes in the content and execution of these tasks - changes which have their effects on the organization of the library and on the library as an organization. No end to these changes is in sight; in fact, an acceleration of the pace of change is more likely than a slowing down.<sup>1</sup>

Attention must be focused on the new tasks associated with digital library systems and the digitization of scholarly information, and this has to be done without neglecting the library's traditional tasks. Changing the emphasis is not an adequate description of what is required, since the new tasks do not supplant the more traditional ones – they supplement each other and have to be carried out in parallel. One could say that the terms *dual library system* and *dual library* are appropriate for this situation. It is my expectation that such

libraries, characterized by the integration of old and new tasks, will set the tone for the provision of scholarly information for the next years.

The dual library will be based on a foundation of four pillars. It will be a

- (1) *collection centre of printed material*;
- (2) *gateway to digital information* providing access at local, national and international levels;
- (3) *centre of expertise*, focused on all phases and aspects of the information chain;
- (4) centre which can provide *study facilities* incorporating the new technologies.

### **The library as a collection centre of printed material**

To support the needs of education and research, it will be important for the library to continue to provide its users with representative collections of printed material. Researchers still expect libraries to contain the most important printed material in their particular field and associated fields. This pertains particularly to researchers in the humanities though, to a greater or lesser degree, scientists in the biomedical, physical and social sciences will not want to do without printed material either.

This applies to an even greater degree to educational needs. Researchers may have to rely on interlibrary loans, but students - at least in the initial stages of their study - should be able to assume that their library can supply the material they need for their study, supplementary, of course, to study material that they have to provide for themselves. Librarians must be aware of the educational curricula within their university, and direct their acquisition policies towards them.

This means that there will still be a need for universities to be served by libraries that exist in the sense of having a physical location, where printed publications are stored, looked after and made available.

### **The library as gateway to digital information**

Compared to printed information, digital information will play an increasing role in the provision of scientific information. This provision is not only influenced by the digitization of information and by information technology, but also by changes within scientific research and within education itself. The researcher is confronted with new knowledge, new insights, and new methods and techniques. Research is increasingly crossing field boundaries, both as far as content is concerned and in a geographical sense. Research results are being exchanged via electronic networks faster than ever before and so are the assessment and publication of research results.

Changes in the field of education are also affecting information provision. Task-directed and problem-oriented education relies more heavily on information than do the more traditional educational methods. Moreover, education is no longer directed solely at those who have just finished their secondary education, but also at academics and at those who have already retired (post-academic education, 'lifelong learning' courses). Many universities are introducing electronic teaching in which intensive use is made of digital teaching materials and new teaching methods including simulation, interactive training, animation and the like.

As a result, it is becoming increasingly important for universities that researchers, teachers and students have easy access to digital information, whether via computers at the university or elsewhere. And, whereas there are relatively simple ways of referring the user to printed literature, it is a much more complex matter for the librarian both to assist the user with and to balance the supply and demand for digital information. The enormous diversity of

sources, access alternatives, ways of carrying out literature searches, information structures and presentation forms mean that functions such as information mediation and information reference have undergone a radical change of character. Librarians of the future will be living in a 'library without walls', and will have to learn to operate in an information jungle without losing their own or the user's way.

Library users will not only expect the library to be able to provide them with access to digital information, but will increasingly want to access information via search systems specific to their scientific specialization. Researchers will want the 'personal library' to come to them, instead of the other way around. This means that the library will have to make an increasingly large proportion of its budget, energy and personnel available for digital information and digital information services. Librarians will require new and specific expertise and skills to adapt the classical library tasks to digital material. They will have to develop a collection development policy in respect of digital information;<sup>2</sup> to know how this material ought to be acquired and, consequently, to be aware of the politics of licensing. Librarians will have to determine how and by what means this material can be classified and made available to the public and what are the best ways of archiving and conservation.

One of the most important tasks that the librarian is going to be faced with is the solving of problems related to the rapidly emerging electronic journals. Researchers already expect to be able to access via their personal computers most of the journals they need for their work. New financing systems (for example, purchasing electronic journals per set instead of per title) have to be explored and put into practice. Issues of internal financing (who within the university pays what when campuses enter into licensing arrangements) and management (registration, administration, management information) of digital journals and other digital material will have to be addressed. In addition, copyright issues in relation to digital material will influence the implementation of interlibrary loan arrangements.

Librarians will have to sift the large volume of digital information that is freely accessible via the internet (websites, source material, archival files, visual material, etc.), to determine what is suitable for inclusion and how it can be classified and made available to the public via the university's systems. It goes without saying that activities in this area will have to be co-ordinated at a national and international level to make it possible for assignments to be carried out without encountering huge difficulties or duplicating work.

## **The library as an expertise centre**

As a consequence of the digitization of information, the information landscape has become much more complex. In addition to expertise in the field of printed material, librarians must be digital information experts and be able to turn the library into a centre for information expertise. This expertise centre will have both back- and front-office elements within it.

### *Expertise centre as back office*

In its back-office function, the expertise centre will have to take charge of the development and implementation of systems to assist the user in searching for information. Issues that play a role here include the standardization of classification procedures and of search and retrieval techniques and facilities. The expertise centre will have to work on user-friendly interfaces and powerful search engines. It is important to develop electronic directories and expert systems and to integrate or aggregate information (or files of information) via linking and other techniques,<sup>3</sup> and, where at all possible, all of this has to be investigated and developed in conjunction with others. Libraries have a good reputation in the field of national and

international cooperation - a tradition that needs to be maintained if we are to avoid 're-inventing the wheel'.

As an expertise centre, the library will have to create an information infrastructure of such quality that the chance of the user getting lost is minimized. In doing this, the library will, in the first place, have to concentrate on those parts of the information chain that have always been part its work. But as I see it, the library as expertise centre also has tasks that extend to those parts of the information chain that it has not previously addressed, or has addressed to a lesser degree.<sup>4</sup>

### **The library as expertise centre and the chain of information**

At present, authors nearly always produce their publications electronically, send them electronically to colleagues in the same field for discussion and assessment, and publish and distribute them electronically. This means that in effect, all processes in the chain of information have become digital. The library must be able to assist these processes in its capacity as an information expertise centre.

The author must be able to count on getting support when digitally preparing his publication in a certain format and using a particular word processing system. He or she might be able to get such support from the university's publisher or the university computer centre, but the library also comes into the frame here. Once the publication is ready, the library is the appropriate body (or one of the appropriate bodies) for the provision of electronic publication and distribution facilities.

One of the issues under discussion is whether the university should endeavour to digitally publish all of its researchers' scientific output within the university or via the university's own channels. There is much to be said for doing this with doctoral theses, inaugural lectures and the like. Nevertheless, I believe that the freedom of authors and research groups to choose their own publishing channels for their research results ought to be respected. In my opinion, the first port of call for the publication of scientific articles and other matters should be open archive infrastructures or the infrastructures of learned societies and commercial scientific publishers rather than the researcher's own university. With some exceptions, scientific research is national or international in nature; consequently, the infrastructure used for the publication of such research should also be national or international.<sup>5</sup> The one does not have to exclude the other, however. In any case, there seems to be no reason why libraries should not participate actively in the process, bearing in mind that assessment and recognition at a national and international level is of crucial importance for the researcher.

As far as expertise and management is concerned, I am an advocate of universities looking after the entire information chain, including publication, within their own walls. Experience has taught us that universities are able to successfully take on the job of publishing themselves. This does not mean, however, that I am advocating banning or doing away with commercial publishers. Some aspects of publishing (marketing, for example) are less suited to university ways. My library has consequently chosen to publish a periodical in a joint venture with a (not-for-profit) publisher.<sup>6</sup> I envisage a plurality of publishing situations for scientific material in the future. In principle, not a single party within the information chain need find itself redundant.

Just as universities are moving into the field that was once the sole prerogative of publishers, the reverse situation is also occurring: publishers and other suppliers of information are taking over typical library tasks such as document delivery and end-user services. This mix is likely to continue in the future and it is unclear how long it will take before a new balance is found between all of the actors within the information chain.

## **The information chain: storage and archiving**

I want to make a few brief comments about the final phase in the information chain: the process of filing, storage and archiving of information, whether printed or digital. As we all know, this is by no means an easy task for printed material and the non-physical nature and immense volume of digital information means that the library has to face quite another situation here.

It is neither feasible nor necessary for the library to file, store and archive all digital information locally, and local accessibility can be restricted to information that specially refers to the particular university. The storage and conservation of all other digital information ought to be organized in consultation with national or international bodies. National libraries have a specific responsibility within such processes. It is fortunate that an increasing number of other bodies (JSTOR, for example) and publishers are aware of the issues involved and are proposing or working on solutions. However, it is going to take some time before specific and appropriate solutions are found.

The library should not restrict its expertise in the field of filing, storage and conservation to printed and digital materials, but should also include other types of information carriers. There are a lot of places within universities (too many, really) where records of slide collections, photographic files, sound recordings and other sorts of collections (both in the form of documents and otherwise) are still being kept, usually in outdated card systems. It is important that the valuable material of this type be better conserved than it is, preferably by digital means in the future, but also retrospectively. Depending on the university's policy and its financial and personnel situation, the library is the most appropriate body to assist such processes. As a rule, it will not be able to carry out digitization on any great scale itself, but nevertheless it ought to make sure that, whatever else happens, classification and public accessibility are done adequately. Information will increasingly be multimedia in character; consequently, libraries ought not to neglect multimedia information carriers, whatever form they take.

### *Expertise centre as front office*

As an expertise centre, the library's *front-office* function is even more important than the back-office function. The expertise that the library has built up has to be made available to its users via high-quality service. Just like any other library, my library is able to offer its users a whole range of services. Yet, whenever various user groups are asked about what services they know are available, the result is disappointing in many ways. In spite of briefings, user instruction, printed and electronic directories, information services and so on, there is inadequate knowledge of all the possibilities. When investigations are carried out to ascertain whether there is perhaps no demand or need for these services, they prove to be needed after all. Services that have an intrinsic value remain underutilized because they are not sufficiently known. As a consequence, the library's investment in time and effort brings an inadequate return. The library can never put too much energy into drawing attention to the many possibilities it has in store.

It is for this reason that the library has to advertise itself as a centre of expertise not only internally, but to the outside world as well. A good way of doing this is via the setting up of good help desks, both in physical as well as electronic space, whose job it is to offer library users professional assistance in their search for scientific information. The library will have to organize user support and give instructions on how to search for and retrieve relevant data in various databases via the help desk function. The user will have to be informed about the

content and nature of the printed and digital material that can be accessed, and taught how to look in those data files that are relevant to his or her purposes. Information specialists at the library will have to be prepared to carry out commissioned library searches. In fact, every new research project ought initially to be accompanied by a thorough search of project-relevant information carried out by an information specialist.

### **The library as a modern study environment**

A teaching institution such as a university is not only obliged to provide its students with adequate information material, it is also obliged to make good study facilities available. Good study facilities with modern work areas are of real importance for ensuring the quality of education. The facilities I have in mind ought to both contain printed collections in study areas and provide access to relevant digital information. Virtual and physical facilities should complement each other. In this context, it is equally undesirable to separate physical and digital libraries from each other. The student has a right to study areas where he or she can quietly go over study material and take it in, but also the right to work areas where he or she can work in conjunction with other students on assignments, projects and the like.

The work areas in the library must be able to provide users with access to the university network infrastructure. Since equipping every individual study area with a pc (in my own branch, this would involve about 2,500) would be an onerous undertaking, both from the maintenance and the financial point of view, I would recommend providing the study areas with liberal numbers of remote control network connections so that students can connect to the network using their own appliances (laptops). However, despite this, if the library is to keep its study facilities at a good level, it will not be able to avoid considerable investment and running costs related to hardware, software and licences.

The library's function as provider of study facilities is closely tied to its role as a social meeting place and discussion forum. In its physical form, the library's layout ought to be such that students enjoy coming to meet each other there and exchanging ideas about their field, their study and research projects they are involved in. If the library can provide suitable areas for doing this, it will be making an important contribution to a good scientific and educational climate within the university.

### **The changing role of the librarian**

In the above, I have spoken about the four pillars of the dual-purpose library in a functional sense. How these functions are envisaged within the library's organizational structure will differ from one library to another and depend on the nature and size of the university. In my opinion, they are functions that every library organization will perform (and must be able to perform) in one shape or another. I have gone into the library's functions in such depth because it would otherwise be difficult to say anything concrete about the role to be played by the librarian. I have already mentioned the librarian's tasks several times and, in what follows, I shall deal with some of the issues in a more systematic way.

It will have become apparent that the librarian's functions and roles are undergoing various changes. To be sure, the more traditional tasks will remain but, as set out above, new ones will be added. It will be a matter of a shift in accent from the old to the new. Different work demands will require different qualifications if the job is to be carried out successfully. Nevertheless, within the changing information network, the position of librarian as such is not unfavourable. He is closer to the teaching and research process than the publisher or any other



actor within the field of information. With his daily contacts with students, teachers and researchers, who else is as well aware of their informational needs and as able to satisfy them?

The librarian's role will be characterized by three aspects: he will have to act as an information mediator, information expert and information manager.<sup>7</sup>

### **The librarian as information mediator**

I see a growing need for librarians to be trained at university level or at least to have a technical education at tertiary level. They will need supplementary courses and training sessions to make them *the* information specialists in their particular field. They must have a general knowledge of education and research in their field of discipline and use their knowledge and skills in scientific information to effectively assist the educational and research processes.

They will need to know what printed information is available for acquisition and what digital information has to be licensed and made accessible via the university's network. Librarians will have to be information mediators able to link the supply of information to the demand, or potential demand, for it. They should be able to assist the user in searching for information in various ways including the creation of literature lists, literature searches, current awareness services, the correlation of user profiles in relation to relevant collection data, and so on. They will need to do this at a level that students and starting-out researchers find useful and to make themselves indispensable to researchers by providing them with information that will prevent duplication of effort. In fact, they must be able to completely fulfil research groups' information needs, and to do this at a professional level.

In addition, the librarian will need to have good teaching skills in order to contribute positively to the educational process. Many universities are creating electronic learning environments. The element of the provision of information frequently plays a modest (in my eyes, a too modest) role here. Information plays a major part in the teaching and acquisition of knowledge. In their professional capacity, librarians explain what the information networks of the particular field look like, show students how to get around within them, and how to deal with information. In the development of teaching programmes, librarians must be able to provide input from their own professional point of view.<sup>8</sup>

### **The librarian as information expert**

Librarians will have to be experts in the field of the provision of information able to interact as professionals with information technicians such as programmers and web designers in the development of information systems, specifying how systems involved in searches, navigation, classification, the storage of information, and so on should work, and how their performance should be assessed. They should be able to judge expert systems on the basis of user-friendliness and effectiveness, and have an eye for the degree to which it is desirable and possible to integrate, aggregate and link information files.

As information experts, librarians must be well informed about all aspects of the information chain. If the library is actively involved in the field of electronic publication, librarians must be able to offer assistance in the electronic processing of texts, and must know how texts should be structured in order to be properly filed and electronically distributed. They must be able to make digital library facilities available or build them up according to specific scientific fields (digital research libraries) and be active in the development of digital

library facilities specifically for the personal information needs of scientific researchers ('my library' systems).


### **The librarian as information manager**

Apart from information mediators and experts, the library has to employ librarians who are management specialists. As managers, librarians will have to be well informed about the various business management practices within the library. They must enable the processing of printed and digital material to be carried out as efficiently as possible, and with an eye to finding the best balance between traditional and modern information carriers.

At the same time, as manager of information services, librarians will have to know how best to organize these, and to do so according to the principle of digital services remaining permanently available to the users and localized services remaining operational for as long as possible.

They will be able to negotiate prices with information suppliers and to take out licences with due regard to copyright and other legal implications.<sup>9</sup> They will know how to draw up collection development profiles and collection acquisition budgets and to determine what allocation models can best be used in the financing of printed and digital information within the university.

### **Information as teamwork**

When the future of the librarian is a discussion item on the agenda, the skills required by such professionals are frequently referred to and listed . Then follows the comment that this person actually has to be a jack of all trades or even a wizard of sorts. Alas, the jack of all trades is a rarity in real life, and wizards don't exist: we must realize that attempting to find librarians who fit such descriptions is a waste of time.

Information work is teamwork; teamwork in which the team consists of those with broad-based skills and specialists. It is high time that standard job descriptions for librarians were scrapped and the job divided, with the emphasis on field-specific librarians: it is not very useful to make someone whose training is in the field of psychology an information mediator in the area of the exact or biomedical sciences, or the other way around. In addition, there will be librarians who feel more attracted to the position of information mediator (those who enjoy contacts with others) and others who prefer back-office jobs as information experts (the whiz kids). It is nice if you can find diverse qualities in the one person, but we must not assume that everyone comes equipped this way. We anticipate that the librarian of the future will not be a person who can be profiled in any one way.

### **Virtual and non-virtual realities**

As I have tried to explain, the roles of the library and the librarian are changing. However, they are not changing against a background of or with a prospect of purely *virtual* libraries and librarians. We are going to have to stick to physically real and tangible libraries which will continue to stock printed materials and carry out the tasks traditionally associated with them. However, if such libraries want to continue to provide superior services to their users, they are going to have to become actively and intensively involved with digital information and digital services. In these libraries, competent librarians are needed, able to take account

of new developments in the field of education, research and information science and to integrate these into their library services. There is no future for virtual libraries without real, physical ones. And there will be no place for virtual librarians, but only for flesh and blood ones.

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